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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/064,883	08/27/2002	Ko-Hsing Chang	9134-US-PA	6189
31561	7590	10/20/2003	EXAMINER	
JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE 7 FLOOR-1, NO. 100 ROOSEVELT ROAD, SECTION 2 TAIPEI, 100 TAIWAN			KEBEDE, BROOK	
			ART UNIT	PAPER NUMBER
			2823	

DATE MAILED: 10/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary****Application No.**

10/064,883

**Applicant(s)**

CHANG ET AL.

**Examiner**

Brook Kebede

**Art Unit**

2823

-- **The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 01 September 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) 1-9 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 and 16 is/are rejected.
- 7) ☒ Claim(s) 15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☒ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)                      4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)                      5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_                      6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Election/Restrictions*

1. Applicants' election without traverse of Group II (i.e., claims 10-16) in the response filed on September 1, 2003 is acknowledged.
2. Claims 1-9 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the response filed on September 1, 2003.

### *Priority*

3. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Japan on June 12, 2002. It is noted, however, that applicant has not filed a certified copy of the 91112770 application as required by 35 U.S.C. 119(b).

### *Claim Rejections - 35 USC § 103*

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 10-14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jung Lin et al. (US/6,087,222) in view of Lee et al. (US/5,773,343).

Re claim 10, Jung Lin et al. disclose a split-gate flash memory structure, comprising: a substrate (11) having a trench (18) therein; a floating gate formed (FG) inside the trench (18), wherein the upper surface of the floating gate (FG) is lower than the upper surface of the substrate (11); a select gate (CG) formed inside the trench (18), wherein the upper surface of the select gate (CG) is protruding beyond the upper surface of the substrate (11); and a drain region (D) formed on each side of the select gate (CG) in the substrate (11), wherein the drain region and the floating gate (FG) are separated from each other by a distance (see Figs. 1A- 1L).

However, Jung Lin et al. do not specifically disclose a source/drain region formed on each side of the select gate in the substrate, wherein the source/drain region and the floating gate are separated from each other by a distance.

Lee et al. disclose a source/drain region (25 26) formed on each side of the select gate (33) in the substrate (21), wherein the source/drain region (25 26) and the floating gate (29) are separated from each other by a distance (see Lee et al. Fig. 2). As Lee et al. disclose, the channel region 21-1 positioned lower than the source 25 and drain 26 regions as result the information programming and erasing through thin tunneling oxide film 27 at sides of the source/drain regions 25 and 26 possible (see Lee et al. Col. 3, lines 27-35).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of applicant(s) claimed invention was made to have provided Jung Lin et al.

reference with a source/drain region formed on each side of the select gate in the substrate, wherein the source/drain region and the floating gate are separated from each other by a distance as taught by Lee et al. because the arrangement would have provided programming and erasing through the tunnel oxide film at the sides of source/drain.

Re claim 11, as applied to claim 10 above, Jung Lin et al. and Lee et al. in combination disclose all the claimed limitations including the limitation wherein the structure further includes a tunnel oxide layer formed between the floating gate and the substrate (see Jung Lin et al. Figs. 1A-1L and Lee et al. Fig. 2).

Re claim 12, as applied to claim 10 above, Jung Lin et al. and Lee et al. in combination disclose all the claimed limitations including the limitation wherein the structure further includes a gate dielectric layer formed between the floating gate and the select gate (see Jung Lin et al. Figs. 1A-1L and Lee et al. Fig. 2).

Re claim 13, as applied to claim 10 above, Jung Lin et al. and Lee et al. in combination disclose all the claimed limitations including the limitation wherein the structure further includes a dielectric layer formed between the select gate and the substrate (see Jung Lin et al. Figs. 1A-1L and Lee et al. Fig. 2).

Re claim 14, as applied to claim 12 above, Jung Lin et al. and Lee et al. in combination disclose all the claimed limitations including the limitation wherein the gate dielectric layer includes an oxide/nitride/oxide composite layer (see Jung Lin et al. Figs. 1A-1L and Lee et al. Fig. 2).

Re claim 16, as applied to claim 12 above, Jung Lin et al. and Lee et al. in combination disclose all the claimed limitations including the limitation wherein the structure further includes a spacer formed on sidewalls of the select gate (see Jung Lin et al. Figs. 1A-1L and Lee et al. Fig. 2).

***Allowable Subject Matter***

7. Claim 15 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicants' disclosure Hong (US/5,486,714), Wong (US/5,616,510), Hong (US/6,008,089), Liu et al. (US/6,124,608), and Gratz (US/2002/0024081) also disclose similar inventive subject matter.

***Correspondence***

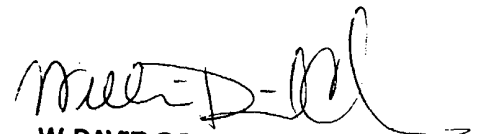
9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brook Kebede whose telephone number is (703) 306-4511. The examiner can normally be reached on 8-5 Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703) 306-2794. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Brook Kebede

October 8, 2003

  
**W. DAVID COLEMAN**  
**PRIMARY EXAMINER**